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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/309,894	05/11/1999	HIROAKI TAKEBE	826.1546/JDH	8094

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EXAMINER

DASTOURI, MEHRDAD

ART UNIT	PAPER NUMBER
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2623

DATE MAILED: 11/14/2003

28

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/309,894

Applicant(s)

TAKEBE ET AL.

Examiner

Mehrdad Dastouri

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 August 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 6-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 6-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. Applicants' amendment filed, August 28, 2003, has been entered and made of record.
2. Applicants' arguments with respect to Claims 1, 9-14 have been fully considered but they are not persuasive.

Regarding Claims 1 and 9-14, Applicants argue in essence that prior art of record (Lyon) does not disclose "A feature amount extracted from a word matches a feature amount obtained by combining the respective feature amounts extracted from a plurality of characters composing the word, using the composition operation."

The Examiner disagrees and indicates that Lyon's teachings depicted in Figures 14 and 15 incorporates the same procedure as recited in the instant invention disclosure Pages 28-30 and their associated Figures 14 and 15. The ideograph "Forest" in Figure 14 of the prior art comprises of three "one-character word". The recognition process disclosed by Lyon teaches matching feature amounts of ideograph "Forest" (the word) with a feature amount obtained by combining the respective feature amounts extracted from a plurality of characters composing the word (the feature amount of the characters "Tree" composing the word "Forest"). Furthermore, the instant invention also utilizes the feature amount of characters in the process of target recognition.

3. Applicants' arguments with regard to Claims 7 and 8 are moot in view of new grounds of rejection.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 10, 12, 13 and 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 10 and 12 refers to a list of at least one recognition candidate pattern string for generating feature amounts by a composition operation while the feature amounts of the word stored in a list of one candidate word is referred to and utilized in further limitations concerning further details of composition operation. This configuration is vague and indefinite.

In Lines 11-13 of claim 13, "the word" lacks antecedent basis.

In Lines 4-8, Claim 14 recites "An extracting unit dividing a recognition target in units of meshes, a number of the meshes changed according to a length of the recognition target when the recognition target comprises a plurality of characters, the recognition target is not required to be divided into units even if the recognition target comprises a plurality of units, and extracting a feature amount from the divided recognition target". There is a contradiction concerning initially dividing the target pattern into units of meshes and afterward stating that the recognition target is not required to be divided into units.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1 and 9-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Lyon (U.S. 5,675,665).

Regarding Claim 1, Lyon discloses a word recognizing apparatus, comprising:

a listing unit for storing a list of at least one candidate word comprising a plurality of characters (Figure 1, lexicon memory 30, word memory 32; Column 4, Lines 63-67; Figures 3, 4 and 11-16);

a dictionary unit storing feature amounts of a plurality of characters (Figures 1, 5-7 and 11-16, bounds measurement memory 36, bounds model memory 38; Column 10, Lines 39-67, Column 11, Lines 1-25. Based on the feature amounts extracted from the training word characters, feature amounts of plurality of model characters are extracted and stored in bounds model memory 38 as depicted in Figures 6 and 7.);

an extracting unit extracting a feature amount from a recognition target by a process in which the recognition target is not required to be divided into units even if the recognition target comprises a plurality of units (Figures 14-16; Column 20, Lines 34-62. Word recognition unit 22 generates a feature amount (Figure 3; word structure 60) for only a candidate word shown in Figure 14 (word or ideograph 300). The ideograph "Forest" in Figure 14 of the prior art comprises of three "one-character word". The

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recognition process of ideograph "Forest" does not require dividing the ideograph into units because it only requires the feature amount of the one-character word "Tree".);

a generating unit referring to the list of at least one candidate word stored in said listing unit, and dynamically generating a feature amount of only a candidate word registered in the list by a composition operation using the feature amounts of characters stored in said dictionary unit during a recognition process for the recognition target (Figure 16; Column 21, Lines 3-28), the feature amounts of the word and characters and the composition operation determined such that the feature amount of the word generated by the composition operation matches a feature amount extracted from the word by said extracting unit (Figures 14-16; Column 20, Lines 34-67, Column 21, Lines 1-28. Feature amount of the word "Forest" is generated by the composition operation of integrating the feature amounts of characters "Wood". Figures 2, 5A-B, 6 and 7. Feature amounts of the word "feed" is generated by using feature amounts of plurality of characters "f", "e" and "d");

a collating unit collating the generated feature amount of the word with the feature amount extracted from the recognition target and outputting a recognition result (Figures 11-13; Column 20, Lines 63-67, Column 21, Lines 1-28. The feature amounts of a recognition target (e.g., Radical 300 meaning "wood") will be precisely compared with the feature amount of bound models 104 by bound evaluation unit 26.).

With regards to Claims 9-14, as best understood by the Examiner, arguments analogous to those presented for Claim 1 are applicable to Claims 9-14.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 2 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lyon (U.S. 5,675,665).

Regarding Claim 2, Lyon discloses the word recognizing apparatus according to Claim 1, wherein said collating means includes a memory means which stores the feature amounts of the word (Figure 1, bounds measurement memory 36, bounds model memory 38). Lyon et al does not explicitly disclose releasing the memory means when a collation of the feature amount of the word is completed, and storing a feature amount of the next word. Utilizing a region of memory (buffer) for using as an intermediate repository in which data is temporarily held while a specific instruction is being executed is well known in the art (Official Notice).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Lyon invention to incorporate releasing the memory location when a collation of the feature amount of the word is completed, and storing a feature amount of the next word in that location because it is a well known procedure routinely implemented in the art.

Regarding Claim 8, Lyon further discloses the word recognizing apparatus according to Claim 1, wherein said listing unit stores a list which has a high possibility of containing a word corresponding to the recognition target (Column 4, Lines 46-61).

Lyon et al does not explicitly disclose selecting a list from among the plurality of lists according to a previous recognition result.

The lists containing words having highest possibility of matching with the recognition target are conventionally generated based on the frequency of occurrence of the words in previous recognition processes (Official Notice).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Lyon invention to select a list from among the plurality of lists according to a previous recognition result because it is a conventional procedure routinely implemented in probabilistic pattern recognition to incorporate most relevant and most credible reference patterns.

10. Claims 3, 4 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lyon (U.S. 5,675,665) in view of Tsuruoka et al (Handwritten "KANJI" and "HIRAGANA" Character Recognition Using Weighted Direction Index Histogram Method).

Regarding Claim 3, Lyon further discloses the word recognizing apparatus according to Claim 1, further comprising:

an inputting unit for inputting an image as the recognition target (Figure 1, input device 14). The feature extraction disclosed by Lyon is different from the feature extraction recited in further limitations of Claim 3.

Tsuruoka et al disclose a handwritten character recognition system comprising extracting means for performing a one-dimensional gradating conversion in a direction perpendicular to a connecting direction of characters for a direction code histogram of a contour line in each of the plurality of small areas in an inputted image provided that no gradating conversion is performed in the connecting direction of the characters, and extracting a direction code histogram series obtained from a conversion result as the feature amount of the recognition target (Figures 2 and 3(a); Section 2.1, Weighted Direction Index Histogram Method; Section 2.2, 3-Dimensional interpretation. The gradation conversion is performed in a direction perpendicular to the connecting direction of the characters.).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Lyon invention according to the teaching of Tsuruoka et al to extract a direction code histogram series obtained from a conversion result as the feature amount of the recognition target because it will increase the accuracy and improve the confidence level of the character recognition system.

Regarding Claim 4, Tsuruoka et al further disclose a segmentation algorithm for recognition of handwritten characters comprising extracting means for dividing a length of the inputted image in the direction perpendicular to the connecting direction of characters by a predetermined integer and divides the image into the small areas with an obtained quotient as a size of the small areas (Figure 2; Section 2.2, 3-Dimensional interpretation. The segmentation is performed in a direction perpendicular to the connecting direction of the characters.).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Lyon invention according to the teaching of Tsuruoka et al to divide a length of the inputted image in the direction perpendicular to the connecting direction of characters by a predetermined integer and divide the image into the small areas with an obtained quotient as a size of the small areas because it will improve the accuracy of the character recognition system for narrow width characters.

Lyon does not disclose further limitations of Claim 6.

Tsuruoka et al disclose a handwritten character recognition system comprising generating means generates a new direction code histogram series by arranging a plurality of directions code histograms series corresponding to the feature amounts of characters composing the word and designates a generated direction code histogram series as the feature amount of the word (Figures 2 and 3(a); Section 2.1, Weighted Direction Index Histogram Method).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Lyon invention according to the teaching of Tsuruoka et al to extract a direction code histogram series obtained from a conversion result as the feature amount of the recognition target because it will increase the accuracy and improve the confidence level of the character recognition system.

11. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lyon (U.S. 5,675,665) in view of Ueda et al (U.S. 5,151,951).

Regarding Claim 7, Lyon further discloses the word recognizing apparatus according to Claim 1, wherein said collating unit performs a non-linear matching of the

feature amount of the word and the feature amount of the recognition target, and calculates a degree of similarity between the feature amount of the word and feature amount of the recognition target (Figures 8-10; Column 16, Lines 45-67, Column 17, Lines 1-19. The bounds evaluation unit 26 performs the comparison operation by generating a set of error values E1-E8 that indicates the difference between the recognition target "fog" and character bound models.).

Lyon does not disclose absorbing a shift of the recognition target in a connection direction of characters.

Ueda et al disclose a character recognition device wherein a shift of the recognition target in a connection direction of characters is absorbed (Figures 13 and 14; Column 22, Lines 16-67, Column 23, Lines 1-34).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Lyon invention according to the teaching of Ueda et al to absorb a shift of the recognition target in a connection direction of characters because it will improve the accuracy of the recognition system by providing highest degree of resemblance between the target and reference patterns (Ueda et al; Column 22, Lines 16-25).

Contact Information

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mehrdad Dastouri whose telephone number is (703) 305-2438. The examiner can normally be reached on Monday to Friday from 8:00 a.m. to 4:30 p.m..

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on (703) 308-6604.

The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center Customer Service Office whose telephone number is (703) 306-0377.

MEHRDAD DASTOURI
PRIMARY EXAMINER

Mehrdad Dastouri

Mehrdad Dastouri
Primary Examiner
Group Art Unit 2623
October 17, 2003